

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

Claims 1-10 (Canceled).

11. (New) A Raman amplifying device for amplifying signals ( $S_1, S_2 \dots S_n$ ) with wavelengths  $\lambda_{S1}, \lambda_{S2} \dots \lambda_{Sn}$  comprising an optical path, pump sources ( $P_1, P_2 \dots P_N$ ) for generating a plurality of Raman pump signals ( $\lambda_1, \lambda_2, \dots \lambda_N$ ) for backward pumping and means for coupling ( $2_1, 2_2, \dots 2_N$ ) the plurality of Raman pump signals into the optical path, wherein the plurality of optical Raman pump signals are time-division multiplexed by multiplexing controlling means ( $4_1, 4_2, \dots 4_N$ )

characterized in that the time-division multiplexing frequency is higher than the minimal corner frequency  $f_c$  of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signals ( $S_1, S_2 \dots S_n$ ) and the pumps ( $P_1, P_2 \dots P_N$ ):

$$f_c = \min_{i,j} \left\{ \frac{\alpha_{P_i}}{2\pi \left| \frac{1}{V_{S_j}} - \frac{1}{V_{P_i}} \right|} \right\}$$

where  $V_{Sj}$  and  $V_{Pi}$  are the group velocities of the signal  $Sj$  and the Raman pump signal  $Pi$ ,  $\alpha_{Pi}$  is the attenuation of the fiber at the pump wavelength  $\lambda_{Pi}$ .

12. (New) A Raman amplifying device for amplifying signals ( $S_1, S_2 \dots S_n$ ) according to claim 11

characterized in that the controlling means multiplex the pumps in time so that the pumps that give significant gain to a signal  $Sk$  and the pumps that do not give significant gain to the signal  $Sk$  are alternated in time at a frequency that is higher than the minimal corner frequency  $f_c$  of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signal  $Sk$  and the pumps  $P_N$  ( $P_1, P_2 \dots P_N$ ) that give significant gain to  $Sk$ :

$$f_c = \min_i \left\{ \frac{\alpha_{Pi}}{2\pi \left| \frac{1}{V_{Sk}} - \frac{1}{V_{Pi}} \right|} \right\}$$

where  $V_{Sk}$  and  $V_{Pi}$  are the group velocities of the signal  $Sk$  and the Raman pump signal  $Pi$ ,  $\alpha_{Pi}$  is the attenuation of the fiber at the pump wavelength  $\lambda_{Pi}$ .

13. (New) Raman amplifying device according to claim 12 characterized in that the controlling means multiplex the pumps in time so that the pumps that give significant gain to a

signal  $S_k$  and the pumps that do not give significant gain to the signal  $S_k$  are alternated in time at a frequency that is higher than the maximal corner frequency  $f_c$  of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signal  $S_k$  and the pumps ( $P_1, P_2 \dots P_N$ ) that give significant gain to  $S_k$ :

$$f_c = \text{MAX}_i \left\{ \frac{\alpha_{P_i}}{2\pi \left| \frac{1}{V_{S_k}} - \frac{1}{V_{P_i}} \right|} \right\}$$

14. (New) Raman amplifying device according to claim 12 characterized in that the controlling means multiplex the pumps in time so that the conditions expressed for  $S_k$  are fulfilled for all the signals  $S_k$ ,  $k=1$  to  $n$ .

15. (New) Raman amplifying device according to claim 13 characterized in that the controlling means multiplex the pumps in time so that the conditions expressed for  $S_k$  are fulfilled for all the signals  $S_k$ ,  $k=1$  to  $n$ .

16. (New) A Raman amplifying device according to claim 11 with a fiber wherein this fiber has a reduced corner frequency of the co-propagating modulation transfer functions.

17. (New) Method for time multiplexing a plurality of Raman pump signals in a amplifying device for amplifying signals ( $S_1, S_2 \dots S_n$ ) with wavelengths  $\lambda_{S1}, \lambda_{S2} \dots \lambda_{Sn}$  comprising an optical path, pump sources ( $P_1, P_2 \dots P_N$ ) for generating a plurality of Raman pump signals ( $\lambda_1, \lambda_2, \dots \lambda_N$ ) for backward pumping and means for coupling ( $2_1, 2_2, \dots 2_N$ ) the plurality of Raman pump signals into the optical path, wherein the plurality of optical Raman pump signals are time-division multiplexed by multiplexing controlling means ( $4_1, 4_2, \dots 4_N$ ) characterized by the step:

multiplexing the pumps in time so that the time-division multiplexing frequency is higher than the minimal corner frequency  $f_C$  of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signals ( $S_1, S_2 \dots S_n$ ) and the pumps ( $P_1, P_2 \dots P_N$ ):

$$f_C = \min_{i,j} \left\{ \frac{\alpha_{Pi}}{2\pi \left| \frac{1}{V_{Sj}} - \frac{1}{V_{Pi}} \right|} \right\}$$

where  $V_{Sj}$  and  $V_{Pi}$  are the group velocities of the signal  $Sj$  and the Raman pump signal  $Pi$ ,  $\alpha_{Pi}$  is the attenuation of the fiber at the pump wavelength  $\lambda_{Pi}$ .

18. (New) Method according to claim 17 comprising the step:
- multiplexing the pumps in time so that none of the noises at wavelength  $\lambda_{S1}$  and  $\lambda_{S2}$  and ...  $\lambda_{Sn}$  that co-propagates with the pump experiences high variations of gain in time.